## 10/537017 JC09 Rec'd PCT/PT0 3,1 JUN 2005

## SEQUENCE LISTING

<110>	THE STATE OF OREGON ACTING BY AND THROUGH THE STATE BOARD OF HIGHER EDUCATION ON BEHALF OF OREGON STATE UNIVERSITY Azevedo, Mark Armstrong, Donald Mills, Dallice I. Banowetz, Gary Russell, Brian Groenig, Aleta Elliott, Lloyd								
<120>	BACTERIAL BIOHERBICIDE FOR CONTROL OF GRASSY WEEDS								
<130>	245-67314-02								
<150> <151>	·								
<150> <151>	PCT/US2003/038653 2003-12-05								
<160>	13								
<170>	PatentIn version 3.2								
<210><211><212><213>	1 550 DNA Pseudomonas fluorescens								
<400>	1 gacg aagcggcgta gccacaagga gaaccgctga tgcgcctgtc cgagctgaaa	60							
	ggcc gcaccctgag cctgcccctg accctcgatc ttgcggacgc cgtcggcccc	120							
ggccagt	ttgc aactgctgag cctgttgcgt gtattgccgg gcgagcgtta cgtgggcgcg	180							
gcggtct	tggc gcgggcgtgc ggtgctggcc aagttattgg tgggcagcaa ggccgcgcgg	240							
catttt	cage gtgaactcac gggegtgege etgetggeeg aacaeggeet gaccaeeeee	300							
cggttg	ctcg ccgatggctt gcaggaaggc gagggcggtt ggttgctgtt cgagttcctc	360							
gaaggcg	gccg aaagcctggc cgatgcctgg caggcccgtt cgaagcgctg ccgccgctgg	420							
ccgacga	aaca aaccgcggtg ctcgccgaag cgctgggtgc gatcgcgcag atgcacacca	480							
aggctgt	tggc agaagactgc atctggacac ctgctgcgcc aggacggcaa gctgtacttg	540							
atcgaco	gtgc	550							
<210><211><211><212><213>	2 5178 DNA Pseudomonas fluorescens								

<400> 2 60 cgaatteett gatettgtgg atettgeegt tttegeegta geegaagaac gtggtggegt 120 actcaccctt accgtcgata ccgaggatcg cggttttttc ctggaagccc gagcagtggt 180 aagcactgga ggcgtgggcc aggtggtgct caaccggttc gatcttgatt ttcttcggat cgaagcccag ttgctccagg caccagacga tcttgttgcg gtagcgcttg tagcgacggt 240 300 tgcccatcag gatcgcgtcg agggcacggt ccggggcata ccagtaacgc ttggcgtagt gccagcgcgc ctcgccgaac agactgatcg gagcgaacgg gatcgccacc acgtcaacgt 360 cggaaggett gatgccggcc tgttccaggc agaacttcgc cgactcgtag ggcatgcggt 420 480 tetttgcatg tttgtegegt acgaageget ettettegge ggeegegate agettgeegt cgatatacag ggctgcggaa ggatcatggc taagggcgcc ggacaggcca agaatcgtca 540 600 atgccacagg ggtctagcct cttttagtct gcatgcaggc gggtcgcgcc tgaaaaaagt 660 gtgcttcccg cctgggcagg aaacagctaa agggcgggat tatagcttaa aagcagacga 720 aagctgttag cggcaagcgg caagccatta ggaactagcg gagttcaagg ctgccgtggg 780 cactttgccg gtagatcgta taggggagaa tgagcatgtc gaggacgccg gagacaggca agtcaagaac ggcccagggc acgccgggaa tgaatccggt aatacgatcg ttcccacgcg 840 900 cgcgtgggaa cgatcaatac aggcctctca cgtgaagcac ggggaaccat cacacttgcc 960 tgggcaaccg ctgatcaatc agttggtaca acgcactgtc ctgcggccag ttacgcatga 1020 accgcgcccg atccctggca tatgccggtg cgaaactggc ggctgagctg tgctgacaga 1080 ccgaatccag atcaatcagc gcccagcggt cttcgtgcca gaacaggttg tggcccttga aatccccatg gctgatgcgc tcgccaataa gttgggcaaa caggtggtcc agggccagca 1140 1200 attegtttte eggegegtea eegttgtega tgtagggege aaagegeteg atgatgteeg 1260 ggcccggcag gtattcggtg atcaggtagg cacggctgcg cagccagaaa acgcgctttt 1320 ccaatacggc cagtggcttg ggcgtggcga tacccaggaa cgccaggcgg ttgccttcac 1380 gccaggagtg ccaggegegg cttgggegec agaagegttt gagecaatgg gegaaceeet 1440 tgatgttgta acgettgate accaacggae gaccggecae etegacettg gecacgetgg 1500 eggeacegee ggtettgtae aggtggeege ggtegageag egeateggee tgtteeagea ceggeageat egeaggetet tettegegae gaategegeg caaaccaaac geacegegea 1560 ctacgctgaa cagcgtgcat tcacggccgg ccttgttcaa aaagtccttc aagcgccagg 1620 cactgacett gegeacetgt ttttecageg ettgeagegg caaegegtge teaetgttge 1680

1740 cgagcaggta atacaccagc agctcctcgg taaacggctc gaggtttttc ggcaattggg 1800 cgaaaaacac accgaggttt tccagtactc ggttgcgcga cagcggttta ccggcctctt 1860 cgacacggat gcccgcaccg tcgatcaagt acagcttgcc gtcctggcgc agcaggttgt 1920 ccagatgcag gtcttcctgc cacagccctt tggtgtgcat ctgcgcgatc gcacccagcg 1980 cttcggcgag caccgcggtt tgttcgtcgg ccagcggcgg cagcgcttcg acggcctgcc 2040 aggcategge eaggettteg gegeettega ggaactegaa eageaaceaa eegeeetege 2100 cttcctgcaa gccatcggcg agcaaccggg gggtggtcag gccgtgttcg gccagcaggc gcacgcccgt gagttcacgc tgaaaatgcc gcgcggcctt gctgcccacc aataacttgg 2160 2220 ccagcaccgc acgcccgcgc cagaccgccg cgcccacgta acgctcgccc ggcaatacac 2280 gcaacagget cagcagttgc aactggccgg ggccgacggc gtccgcaaga tcgagggtca 2340 ggggcaggct cagggtgcgg ccggcctttt tcagctcgga caggcgcatc agcggttctc 2400 cttgtggcta cgccgcttcg tcaggcgctg cagccaggtg gcgaccagcg gcactgtctt 2460 caggotggte gagataagce gccagcaatt ggcgcacctg cgcgttcgac cactgcggtg 2520 cgcggcgcaa cagcggctcc aggtccttga cccggtcacg ccagccgaac agcaacgggc 2580 gggttttctc caggtcgatc aactgcgcgg cgtaaccgtc accgggggcc tgcaaaaaa 2640 tatgcttggg gtaaaaacag ccatgcacct ggcccacgcc atgcagccgg cgcgccagcc 2700 ggccacaggc cagcaggatg gcccggtgtt gggcgtcgct cagttgcggc cattgctcca 2760 gcaccgaatc caggtcgttc cagccatcca gggcacgggt cagcaacatc gcgcggtgtt 2820 cgccagccac cttgcgttcg ccatagaacg ccgcctgcaa cgccgggatg cccagcgtgc 2880 gataacggct gatattgcga aactcgcggg agaaactcgg ctcgcccaac ggccggtgca gactgcgggt gaggtagttg ctctggcgct tgaggtaata cccgtggccc tctatctcca 2940 3000 ggcggaacac actgetecaa eegeegegae tggtgttegg etegtegaeg gegteeagtt 3060 gettggeeca cagegegteg aatgtegeea ggeegttaeg etceageaeg geaeggtett 3120 cagccgccag aaaatcactc attcgcgccc ctcgaaaaac ttcaccacgt ggcgaatccg 3180 ccgtttgtcc gaatcactca ggtgccgact gccacggtac tgcaagtaga aacgcaggcg 3240 ttgggtggcc gacaggtgat acttggccac tttgtccagg caagccaggt ccttggtgat gcggtatttg agccagaaac cacgccagaa atcgccgttg ggacagtcga tcaaatacag 3300 ggtcgactga tcatcgacca gcaggttgcg ccacttcaaa tcgttatggg tgaagcgatg 3360

3420 atogtgcatg gtgcgcgtgt attcggcgag ctggcggctg accgcatcga cccatttggg 3480 gtcgcgcagg cgcgcatcgc ggtgctcggc cagcaccgag aggtcttcgg tgcgtggcaa 3540 ctegegggtg atcategege caeggteata ggecaggeeg ttaegeteea ggececagge caccacgtcg gcggtgggta tgccccactt ggcgaagcgc ttgaggttct gccattcgga 3600 cttgacccgc ggcttgccca ggtagcgtcg caggcccttg ccggcgccga cgtagcgctt 3660 3720 gacgtagtaa ttgaccccac cgcgctgcac ccggatcacc tccgacaacg ggtcgcgggt 3780 caggogotog cottgoaggg cgaacaccgc ttcgaggctg ccgaaaatca tccgccaggt tggcgtacgc aggttccagg atccaacccg ccatcagagc gcatctccat atcgctgctt 3840 3900 gegtgegtag agettgtegg cettggettg cagecactge aacaaegege tttettegge 3960 caggacetgg egeaacgget getggaagta gecettgaga aagegeaget tgteacggeg 4020 ggtcaggccg atgtccagcg ccgagaagta cagcgcggcc aggtccttgt cgcgccagcg 4080 atgactgate ttgtegeggg tetgggegeg gtgeaggteg ateacegaaa gtttgaagtg 4140 gtcggcggtc accggcgtgt cagtgtgcaa caggaaatgg cagatgtagc agtcgcgatg 4200 gttgaccccg ccgcgatgca tcatgcccgt catgcgcgcc acttcggcga tcagcgcacg 4260 cttgagacgt ggctcgggcg gctgtttgcg ccagtcgatg ctgaaatctt ccaggctgac 4320 ggtgggcgcc aactcctcgg tgacgatgaa cgaatgctga tcggccgggt tgctgccgcg 4380 ctcgccataa gccaccgcgg tcatggtcgg cacacccaat gcctgcaagc gctggatcgc 4440 cagccattcc tggccggcgc ccaataccgg gagtttggcg gtgaccaggt tcttgacgat 4500 ctcgcccag ccgatgccac ggtgaatctt cacgaaatag ccacggccat ccacctcggt 4560 acgcaaggtg cgacgcgctt cgagttcacg gtacacctcg ccytccagcg ccttcgacgg 4620 eggegaacge ategegeeeg geeeagaggg tettgaacgg tteggeaage ateaacttea 4680 tggttttggc tccgccagaa tcacatccgc agcgtgctgc ggcatgctgt agaggtcggc 4740 cgtctcggcg aaggccaacc cattgcggct ccaggccgcg cgctgtgcag cgtcactcaa 4800 catacgtacc aggtagccgt tgagctgcgc ttgttcaaac ggctcatcca gcaccaggcc 4860 gctgtcggcc tcattgatgt aatgggcata accacacc gccgagacca gcaccggcag 4920 gccggccacc agggcttcga gcaacacggt gccggtattt tcgttgtacg ccgggtggat 4980 caacaggtcg gcgcccagca ggaaacgcgg aatgtcgctg cgtcccttga ggaactgcac gttatcgccc aagcccaacg tggcgctctg caattggaat actttggggt cgtcctggcc 5040 gattacaaac agacgggtgc gtttcttcag ttccgcgggc aaggcggcca cagccttgag 5100

atcgccgagg ttgaattc															
<210> 3 <211> 459 <212> PRT <213> Pseudomonas fluorescens															
<400> 3															
Met 1	Arg	Leu	Ser	Glu 5	Leu	Lys	Lys	Ala	Gly 10	Arg	Thr	Leu	Ser	Leu 15	Pro
Leu	Thr	Leu	Asp 20	Leu	Ala	Asp	Ala	Val 25	Gly	Pro	Gly	Gln	Leu 30	Gln	Leu
Leu	Ser	Leu 35	Leu	Arg	Val	Leu	Pro 40	Gly	Glu	Arg	Tyr	Val 45	Gly	Ala	Ala
Val	Trp 50	Arg	Gly	Arg	Ala	Val 55	Leu	Ala	Lys	Leu	Leu 60	Val	Gly	Ser	Lys
Ala 65	Ala	Arg	His	Phe	Gln 70	Arg	Glu	Leu	Thr	Gly 75	Val	Arg	Leu	Leu	Ala 80
Glu	His	Gly	Leu	Thr 85	Thr	Pro	Arg	Leu	Leu 90	Ala	Asp	Gly	Leu	Gln 95	Glu
Gly	Glu	Gly	Gly 100	Trp	Leu	Leu	Phe	Glu 105	Phe	Leu	Glu	Gly	Ala 110	Glu	Ser
Leu	Ala	Asp 115	Ala	Trp	Gln	Ala	Val 120	Glu	Ala	Leu	Pro	Pro 125	Leu	Ala	Asp
Glu	Gln 130	Thr	Ala	Val	Leu	Ala 135	Glu	Ala	Leu	Gly	Ala 140	Ile	Ala	Gln	Met
His 145	Thr	Lys	Gly	Leu	Trp 150	Gln	Glu	Asp	Leu	His 155	Leu	Asp	Asn	Leu	Leu 160

gctgcggtcg acgcccttgg tcttgaagcc cgagccgatt tgcaccagca acaggtcgtc

Arg Gln Asp Gly Lys Leu Tyr Leu Ile Asp Gly Ala Gly Ile Arg Val

Glu Glu Ala Gly Lys Pro Leu Ser Arg Asn Arg Val Leu Glu Asn Leu Gly Val Phe Phe Ala Gln Leu Pro Lys Asn Leu Glu Pro Phe Thr Glu Glu Leu Leu Val Tyr Tyr Leu Leu Gly Asn Ser Glu His Ala Leu Pro Leu Gln Ala Leu Glu Lys Gln Val Arg Lys Val Ser Ala Trp Arg Leu Lys Asp Phe Leu Asn Lys Ala Gly Arg Glu Cys Thr Leu Phe Ser Val Val Arg Gly Ala Phe Gly Leu Arg Ala Ile Arg Arg Glu Glu Gro Ala Met Leu Pro Val Leu Glu Gln Ala Asp Ala Leu Leu Asp Arg Gly His Leu Tyr Lys Thr Gly Gly Ala Ala Ser Val Ala Lys Val Glu Val Ala Gly Arg Pro Leu Val Ile Lys Arg Tyr Asn Ile Lys Gly Phe Ala His Trp Leu Lys Arg Phe Trp Arg Pro Ser Arg Ala Trp His Ser Trp Arg Glu Gly Asn Arg Leu Ala Phe Leu Gly Ile Ala Thr Pro Lys Pro Leu Ala Val Leu Glu Lys Arg Val Phe Trp Leu Arg Ser Arg Ala Tyr Leu Ile Thr Glu Tyr Leu Pro Gly Pro Asp Ile Ile Glu Arg Phe Ala Pro Tyr Ile Asp Asn Gly Asp Ala Pro Glu Asn Glu Leu Leu Ala Leu Asp His Leu Phe Ala Gln Leu Ile Gly Glu Arg Ile Ser His Gly Asp

405 410 415

Phe Lys Gly His Asn Leu Phe Trp His Glu Asp Arg Trp Ala Leu Ile 420 425 430

Asp Leu Asp Ser Val Cys Gln His Ser Ser Ala Ala Ser Phe Ala Pro 435 440 445

Ala Tyr Ala Arg Asp Arg Ala Arg Phe Gln Val 450 455

<210> 4

<211> 351

<212> PRT

<213> Pseudomonas fluorescens

<400> 4

Met Ala Asp Ala Leu Ala Asn Lys Leu Gly Lys Gln Val Val Gln Gly
1 5 10 15

Gln Gln Phe Val Phe Arg Arg Val Thr Val Val Asp Val Gly Arg Lys 20 25 30

Ala Leu Asp Asp Val Arg Ala Arg Gln Val Phe Gly Asp Gln Val Gly 35 40 45

Thr Ala Ala Gln Pro Glu Asn Ala Leu Phe Gln Tyr Gly Gln Trp Leu 50 55 60

Gly Arg Gly Asp Thr Gln Glu Arg Gln Ala Val Ala Phe Thr Pro Gly 70 75 80

Val Pro Gly Ala Ala Trp Ala Pro Glu Ala Phe Glu Pro Met Gly Glu 85 90 95

Pro Asp Val Val Thr Leu Asp His Gln Arg Thr Thr Gly His Leu Asp 100 105 110

Leu Gly His Ala Gly Gly Thr Ala Gly Leu Val Gln Val Ala Ala Val 115 120 125

Glu Gln Arg Ile Gly Leu Phe Gln His Arg Gln His Arg Arg Leu Phe 130 135 140

Phe Ala Thr Asn Arg Ala	Gln Thr Lys A	arg Thr Ala His	Tyr Ala Glu					
145 150		155	160					
Gln Arg Ala Phe Thr Ala	•	Gln Lys Val Leu	Gln Ala Pro					
165		.70	175					
Gly Asp Leu Ala His Leu 180	Phe Phe Gln A	arg Leu Gln Arg	Gln Arg Val 190					
Leu Thr Val Ala Glu Gln	Val Ile His G	Gln Gln Leu Leu	Gly Lys Arg					
195	200	205						
Leu Glu Val Phe Arg Gln	Leu Gly Lys H	His Thr Glu Val	Phe Gln Tyr					
210	215	220						
Ser Val Ala Arg Gln Arg	Phe Thr Gly L	eu Phe Thr Asp	Ala Arg Thr					
225 230		235	240					
Val Asp Gln Val Gln Leu 245		ala Gln Gln Val	Val Gln Met 255					
Gln Val Phe Leu Pro Gln	Pro Phe Gly V	al His Leu Arg	Asp Arg Thr					
260	265		270					
Gln Arg Phe Gly Glu His	Arg Gly Leu P	Phe Val Gly Gln	Arg Arg Gln					
275	280	285						
Arg Phe Asp Gly Leu Pro	Gly Ile Gly G	In Ala Phe Gly	Ala Phe Glu					
290	295	300						
Glu Leu Glu Gln Gln Pro	Thr Ala Leu A	ala Phe Leu Gln	Ala Ile Gly					
305 310		315	320					
Glu Gln Pro Gly Gly Gly		Phe Gly Gln Gln	Ala His Ala					
325		30	335					
Arg Glu Phe Thr Leu Lys	Met Pro Arg G	ly Leu Ala Ala	His Gln					
340	345		350					
<210> 5 <211> 2391 <212> DNA <213> Pseudomonas fluorescens								

<400> 60 tegetggteg ceacetgget geagegeetg acgaagegge gtagecacaa ggagaacege tgatgcgcct gtccgagctg aaaaaggccg gccgcaccct gagcctgccc ctgaccctcg 120 atcttgcgga cgccgtcggc cccggccagt tgcaactgct gagcctgttg cgtgtattgc 180 cgggcgagcg ttacgtgggc gcggcggtct ggcgcgggcg tgcggtgctg gccaagttat 240 tggtgggcag caaggccgcg cggcattttc agcgtgaact cacgggcgtg cgcctgctgg 300 360 ccgaacacgg cctgaccacc ccccggttgc tcgccgatgg cttgcaggaa ggcgagggcg 420 gttggttgct gttcgagttc ctcgaaggcg ccgaaagcct ggccgatgcc tggcaggccg 480 tegaageget geegeegetg geegaegaac aaacegeggt getegeegaa gegetgggtg cgatcgcgca gatgcacacc aaagggctgt ggcaggaaga cctgcatctg gacaacctgc 540 600 tgcgccagga cggcaagctg tacttgatcg acggtgcggg catccgtgtc gaagaggccg gtaaaccgct gtcgcgcaac cgagtactgg aaaacctcgg tgtgtttttc gcccaattgc 660 cgaaaaacct cgagccgttt accgaggagc tgctggtgta ttacctgctc ggcaacagtg 720 780 agcacgcgtt gccgctgcaa gcgctggaaa aacaggtgcg caaggtcagt gcctggcgct 840 tgaaggactt tttgaacaag gccggccgtg aatgcacgct gttcagcgta gtgcgcggtg 900 cgtttggttt gcgcgcgatt cgtcgcgaag aagagcctgc gatgctgccg gtgctggaac 960 aggecgatge getgetegae egeggeeaee tgtacaagae eggeggtgee gecagegtgg 1020 ccaaggtcga ggtggccggt cgtccgttgg tgatcaagcg ttacaacatc aaggggttcg 1080 cccattggct caaacgcttc tggcgcccaa gccgcgcctg gcactcctgg cgtgaaggca accgcctggc gttcctgggt atcgccacgc ccaagccact ggccgtattg gaaaagcgcg 1140 1200 ttttctggct gcgcagccgt gcctacctga tcaccgaata cctgccgggc ccggacatca 1260 tegagegett tgegeeetae ategacaaeg gtgaegegee ggaaaaegaa ttgetggeee 1320 tggaccacct gtttgcccaa cttattggcg agcgcatcag ccatggggat ttcaagggcc 1380 acaacctgtt ctggcacgaa gaccgctggg cgctgattga tctggattcg gtctgtcagc 1440 acageteage egecagitte geaceggeat atgecaggga tegggegegg ticatgegta 1500 actggccgca ggacagtgcg ttgtaccaac tgattgatca gcggttgccc aggcaagtgt 1560 gatggttccc cgtgcttcac gtgagaggcc tgtattgatc gttcccacgc gcgcgtggga acgategtat taceggatte atteceggeg tgeeetggge egttettgae ttgeetgtet 1620 ccggcgtcct cgacatgctc attctcccct atacgatcta ccggcaaagt gcccacggca 1680

1740 gccttgaact ccgctagttc ctaatggctt gccgcttgcc gctaacagct ttcgtctgct 1800 tttaagctat aatcccgccc tttagctgtt tcctgcccag gcgggaagca cacttttttc 1860 aggegegace egectgeatg cagactaaaa gaggetagae eeetgtggea ttgaegatte ttggcctgtc cggcgccctt agccatgatc cttccgcagc cctgtatatc gacggcaagc 1920 1980 tgatcgcggc cgccgaagaa gagcgcttcg tacgcgacaa acatgcaaag aaccgcatgc cctacgagtc ggcgaagttc tgcctggaac aggccggcat caagccttcc gacgttgacg 2040 tggtggcgat cccgttcgct ccgatcagtc tgttcggcga ggcgcgctgg cactacgcca 2100 agogttactg gtatgccccg gaccgtgccc tcgacgcgat cctgatgggc aaccgtcgct 2160 2220 acaagegeta eegeaacaag ategtetggt geetggagea aetgggette gateegaaga 2280 aaatcaagat cgaaccggtt gagcaccacc tggcccacgc ctccagtgct taccactgct cgggcttcca ggaaaaaacc gcgatcctcg gtatcgacgg taagggtgag tacgccacca 2340 2391 cgttcttcgg ctacggcgaa aacggcaaga tccacaagat caaggaattc g

<210> 6 <211> 520

<212> DNA

<213> Pseudomonas fluorescens

<220>

<221> misc\_feature

<222> (444)..(444)

"n" equals any nucleotide.

<400> 6

ataggcacct acgtgcaggc gcaacgatga agccgtctcg gcgggtgcga cgttgaaacg 60 120 cgccacattg atgatctgcc cgctgtccac cgaaggggcc aggtgatggc aggtcgagcc 180 gtaggtttca tcgttgtagt agatcgcgta atgctggctg cccaggcccc ggtacttggg cggtgccggg tgcagattga tcgcgccttt gcgggcattc ttgtagatgc tcggcggaaa 240 aatgaagtcg ccacggtagg agatgatcca atcgccttcc cagttatcca gatggtaagg 300 360 atagggatcg cccgggtccc agcaaaacac ctcaaggttg gagaatacgg tcttggcgaa 420 ttcacgccgt gatcgcacca gtccatggtg cacaccgaca gcaggacctt gtcttgcatg gctcgattgt ctgcatctta cttnttcatt tcaggtaatg tgggtgacaa cgcccgcccc 480 520 ccgtcaaagc ccgccttgtc gctagtacgc gacagcctta

<210> 7 <211> 5040

<212> DNA

<213> Pseudomonas fluorescens

<220>

<221> misc\_feature

<222> (691)..(691)

<223> "n" equals any nucleotide.

<400> 7

ggatcccgaa gttcgctact tgcccaacgg taacgccgtg accaacctga gtctggcgac 60 cagegaacag tggacegaca ageagacegg ceagaaggte gagaagaceg aatggeaceg 120 180 tgtgtcgatg ttcggcaagg ttgcagagat cgctggtgag tacctgcgca aaggttcgca 240 ggtctacatc gaaggcaaac tgcaaacccg cgagtgggaa aaagacggca tcaagcgtta 300 caccaccgag atcgtggtcg acatgcaagg caccatgcaa ctgctgggcg gccgtccaca gggcgaccaa caggggcagg gtggcatgtc caactcggca ccgcgtccac aacagtcgcg 360 tecacageca agecageage cacagegtga gtegegteca gegeeceage aggeegetge 420 480 gcaaccggcg ccggatttcg acagctttga tgacgatatt ccgttctaac gcagctttca 540 gtaccgtaac ccataaaaaa gcgaagccat taatctggct tcgctttttt tatggccaca gatttttgtg aagtaacaac tgcgtgcctg ggatcaactc gtatgctgca gcagcggata 600 cagcgaaatc accagcaacg ccgccatgcc gaaattgaac atgcgcagcc agcgcgggtt 660 gegeageacg ttgegeagta cactgeegaa necegeecat acceecacge ttggggegtt 720 780 gatcagagcg aacaccgtag cgatgatcac cacgttcatg gtgtagccct gcaagggcgt gtacgtgctg atcgcaccaa ttgccatgac ccacgccttg ggattgaccc actgaaacgc 840 900 egetgegeee cagaacceca ggggettgee tttacetteg gtgtettetg atgeegggee 960 ggaacgggcg atgttccatg ccaggtacag caagtaagcc gcgcccgcat agcgcagcac 1020 ggtgtagagc accggatagg cggtaaaggc tgcacccagc ccaagcccca cggccaatac cagcaccagg aacccggagc tgatacccag gatgtgcggg atggtgcgct ggaagccaaa 1080 gttgacgccc gaggccaaca gcatggcgtt attggggcca ggggtgacgg aagtgacaaa 1140 1200 cgcaaacaaa gcaaacgcca gcattaaatc aaacgacaag gacatggata tttcctggaa acgggccttc gcgcttacct gccacccgga cagcgcggga tacaggtgca gtgtggccac 1260 ttgtagttgg agtcagaaca acgaactgag aaaaccaatg gcaaccatcg agtagaacgc 1320 tgcacaaatc agcccgaagg acttgcgcgt ccgggtgaaa aacggttctg ccgaatgggc 1380

1440 ggaaaacgct aaggcgtagg tacagaaaat caggaaaccc aatagcgcac aggccgccac 1500 cagcacgaaa ctggcccagg ccggcgcgtt gacgctcagg cccacggtgg tcaccgtgaa 1560 ccaggtcaag gccgccttgg ggttagtcag gtgaatgccc aacccctgca aatagaagcc 1620 caggttgcgc gtctgctttt cccgtacttt ggctaccgtc gtggcgttgt gcgccagcgc actgcgcacc gatttccagg ccaggaaaaa cagatagcag gcgccgaaca cttttaacca 1680 1740 caggatgatc tgggtgttgg acatcaacaa cgccgacacg cctgcggcgg tcatcgcgcc 1800 ccagcacaac gacccggaaa tcaccccggc cgccaacgcc aggcccggtg tgcgcccgta 1860 gttcaaggag gtgttggcga tggccaggtt gcccgggcca gggctggcgg tgccgatcac 1920 gtagaccccc agtgccgctg caaaactcga aaactcaaac atagatgcac tcatacccgt cgcgccagcg cgcagtgagc acttcaagcc acccatggct tgaagtgacg gccaagaaaa 1980 2040 agctatttga agcaacgatg atccggctcc tgggcgcgga tcttctccat ccagggcttg agttccgatt gcttgtacag gcgctcgccc caattttccg gcgagaccgg cagtggccgt 2100 cccagcagga tgtagtcggt gagcaggtgg atgaactgct gcaggcaata ggcacctacg 2160 2220 tgcaggcgca acgatgaagc cgtctcggcg ggtgcgacgt tgaaacgcgc cacattgatg 2280 atctgcccgc tgtccaccga aggggccagg tgatggcagg tcgagccgta ggtttcatcg 2340 ttgtagtaga tcgcgtaatg ctggctgccc aggccccggt acttgggcgg tgccgggtgc agattgatcg cgcctttgcg ggcattcttg tagatgctcg gcggaaaaat gaagtcgcca 2400 2460 cggtaggaga tgatccaatc gccttcccag ttatccagat ggtaaggata gggatcgccc 2520 gggtcccagc aaaacacctc aaggttggag aatacggtct tggcgaattc cacgccgtga 2580 tegeaceagt ceatggtgea cacegacage aggacettgt cettgeatgg etegattgte tgcatcttca cttctccatt tccaggtaat gtgggtgaca acgcccgccc ccccgtcaag 2640 2700 cccgcgctgt cgctagtacg cgacagccct gaccactgcg ttgaagcgtt cgaccatttg 2760 ccccagctcc ccttcgctgg tgataaacgg cggtgcaaac agcacatgat tgccgtgcgt tecetgeacg gtgeegetge egggatagat caacaggeeg egetgeaacg cetettgett 2820 2880 gagegeegeg geataegege egeegeeett gaaeggegee ttggtggege ggetetegae 2940 aaactcgacg cccacgaaca gcccgcgccc gcgcacatca ccgacgatat ccaggtcagc 3000 caggetttee etgagecagg egegeaattg etcacegegt tggegeaett gegeeageag gtettegtee tegatgaett gttgeaette caaggeaatg geacaggeea gegggatggt 3060

3120 tgacgtgggt ctggccgttg cccagcacgc ctgaaccacg ggccattacc gagtgcacct 3180 ggtcgctgat caacagtgcc gagatcggca tgtagcccgc cgccaggcct ttgccgaccg 3240 cgaccatgtc cggcacgatg ccgtcgtcgg cataggcgaa cagctgcccg gtacgcccca 3300 tgccggccat cacctcatcg aggatcagca gcacatcgtg acgctcgcac acggccttga tcttgcgaaa gtaaccgggc accgcaggca ccgcgccatt ggtggagccc accacggttt 3360 3420 cggcaaagaa cgccgcgacg ttttcactgc ccaggctgcg aattttggcg tccagttcat 3480 eggecaggeg egtggegtae tgetettege tttegteggg eegttgatea eggtaggegt agcatggcga gacaaactcg gccgccgcga acagttgacc aaacaccgat tggcgctgcg 3540 ggttaccgga gatgctcaag gtgcccaggg tgctgccgtg gtagctctgc cggcgggaaa 3600 tgaacaacga cttttcaggc aagccgcgtt cgcattggta ctggtaagcg attttcatcg 3660 3720 ccagetecat caceteegag eegeeggata aaaactgege aegegeeagg eegeeactgg 3780 ctgccaccag gcgttcggcc agttcctcgg cggcggcggt ggtgaagctg cccgcgtgcg 3840 cccacgccag tttcttcgct tcgcgctcga atgccgctgc gatacgcgga tggccatggc ccaggctcga caccgcgaca ccgccgcagg tgtcgaggta gcgtttgccc gttgcatcct 3900 3960 caagccacac ccctgcgccg ccgaccgcca ggatcggcga ggtgttgaga tttttgtaaa 4020 tcacttttga catgcgcgcg gttccttggg cgattggcct tacgggttac ttacggagtg 4080 atcccaagcc gtcggcgcct ggtgaaagcg ccgcccgaaa cgggacgaat gaaacaccga 4140 acgcgtcagc ccgatgggca gcaacacaac gataaacatc aaaaacgcaa gaaatcttca 4200 tgcagcggta aaagctccaa agagtgaaag ggggtgggga tgcagtccca gccgggatgc 4260 tacgctgcgt ccagtcaacg gcctcgacga aggccggctg ggcggggcgc tcaagcacgt ageggeecag aaceageaeg tecattteeg tgegeatgaa geaggegtae getteetgeg 4320 gegtgeacae gateggtteg ceaegeaegt tgaaegaggt gttgaeeaae aeegageage 4380 4440 eggtgtgete ettgaaactg egeageaggt aggtgaacgg tgegttgttt tetteggtea 4500 ccgtttgcac ccgccgac aggtcgacgt gggtcaccgc cggcaactgc gagcgaatat 4560 ggttgatgct gcccaagccc cgctcggggc cgccttcttg cagcgactgc tgggatttga 4620 tcgagtcggt gaccggcgcg accatcaaca tgtacgggct tttttcgcag atatcgaaat 4680 agttgccggc gtcttcggcc agcacggccg gggcgaacgg gcggaacgac tcgcggtatt 4740 tgatcttcag gttcatggtg cgctgcatct cggggttgcg cgcatcgccg agaatcgaac gegegeceaa ggeeegtggg eeaaaeteea tgegeeeetg gaaceaaeee accaeegeae 4800

cgtcggccag gcgactggcg acctggtcat acagcccggc gtcgtcgtag cgggtaaagg 4860
ggtagtggtt ttccagcagg aactgggcga tttcttcatc gccaaaaccc ggccccagca 4920
ggctgccgct catggcatcg gacttgttgc catccaagtg cgggcgaccg ctgtgcttga 4980
ccgcaaaatc caacgccgcc cccagggcac aaccggcatc gccggccgcc ggctggatcc 5040

<210> 8

<211> 200

<212> PRT

<213> Pseudomonas fluorescens

<400> 8

Met Gln Thr Ile Glu Pro Cys Lys Asp Lys Val Leu Leu Ser Val Cys

1 10 15

Thr Met Asp Trp Cys Asp His Gly Val Glu Phe Ala Lys Thr Val Phe 20 25 30

Ser Asn Leu Glu Val Phe Cys Trp Asp Pro Gly Asp Pro Tyr Pro Tyr 35 40 45

His Leu Asp Asn Trp Glu Gly Asp Trp Ile Ile Ser Tyr Arg Gly Asp 50 60

Phe Ile Phe Pro Pro Ser Ile Tyr Lys Asn Ala Arg Lys Gly Ala Ile 65 70 75 80

Asn Leu His Pro Ala Pro Pro Lys Tyr Arg Gly Leu Gly Ser Gln His 85 90 95

Tyr Ala Ile Tyr Tyr Asn Asp Glu Thr Tyr Gly Ser Thr Cys His His
100 105 110

Leu Ala Pro Ser Val Asp Ser Gly Gln Ile Ile Asn Val Ala Arg Phe 115 120 125

Asn Val Ala Pro Ala Glu Thr Ala Ser Ser Leu Arg Leu His Val Gly 130 135 140

Ala Tyr Cys Leu Gln Gln Phe Ile His Leu Leu Thr Asp Tyr Ile Leu 145 150 155 160

Leu Gly Arg Pro Leu Pro Val Ser Pro Glu Asn Trp Gly Glu Arg Leu 165 170 Tyr Lys Gln Ser Glu Leu Lys Pro Trp Met Glu Lys Ile Arg Ala Gln 180 Glu Pro Asp His Arg Cys Phe Lys 195 200 <210> 9 <211> 549 <212> DNA <213> Pseudomonas fluorescens <400> gcccaggaca gcggcaccat gcaggcctgg ctcgaccgct atttcaacca ggcccatcgc 60 ctgccggatt tgagcccatc ggggttcaag ccggtcagcg ggcgtttgct cagcaccgag 120 caaqqcqctq ccqccatqqt qctttaccag gacgcgcaag gccggcgcat cagtttctat 180 atcoggoogc oggggoogaa caacggtttt ctaccgogtg gcagcogcac ogcagatggg 240 ctgcaagcgc aatactggtc cggcggcggc tacaactatg cggtcgtcag cccggcggac 300 caggtgcccg cacacctgtt gcagttctag gcgcggcgct cctgtattgg tcaaatcagc 360 gcgagcgccc taaagtgagc gaccaccgca ctacagagtg actcgcattg gccgtgcttc 420 cctqctccqt cqttactcqq taaacacaqc qccccacqac acctcqccat caqqcattct 480 540 ttgagaacca ggcccggcaa caggttacac ctcagcgcgc agtccggcat cgccgcatga 549 cgcgaaccg <210> 10 <211> 3279 <212> DNA <213> Pseudomonas fluorescens <400> 10 ctgcaggcgt tcgatcaact caacaccgaa caacgcgcgt tgttgctgtg ggtctcggtc 60 gaaggettga getacaagga agtegeegaa atactegaeg tgeegettgg cacegtgatg 120 tcacqcctqt cccgcqcccg ccaagccctg cqgcaactca qcgacggcga aattgccagc 180 240 ccttccctgc ggatactcaa atgatcagcc tgcccccag cgaacgcgac ctgcatgcct acgtcgatca ccaactcctg gagagcgatc gccgtgttct cgaaacgtgg ctgaccgcgc 300 360

accordacgt cgcggcccaa gtgcatgcct ggcagcagga tgcgcagttg ctgcgcgcgt

420 cattgagegg egecetgeaa eagecegeea acceeaacet tgaceeggeg etgattegee 480 agegeateca geaceggteg egeegeeact tegecaegge egeegtgttg etgategeeg 540 tgagcettgg eggeetegge ggetggeatg eeegtgaage eaegeaatea eeeeaaeage 600 caatggccga cgcgatgcaa gcgttccggc tgtttgccca ggacggcatc ctgcccgccg attacaacgc ccaggacagc ggcaccatgc aggcctggct cgaccgctat ttcaaccagg 660 720 cccatcgcct gccggatttg agcccatcgg ggttcaagcc ggtcagcggg cgtttgctca 780 gcaccgagca aggcgctgcc gccatggtgc tttaccagga cgcgcaaggc cggcgcatca gtttctatat ccggccgccg gggccgaaca acggttttct accgcgtggc agccgcaccg 840 900 cagatgggct gcaagcgcaa tactggtccg gcggcggcta caactatgcg gtcgtcagcc eggeggacca ggtgeeegea eacetgttge agttetagge gegggegete etgtattggt 960 1020 caaatcagcg cgagcgccct aaagtgagcg accaccgcac tacagagtga ctcgcattgg 1080 ccgtgcttcc cctgctccgt cgtttactcg gtaaacacag cgcccccac gacacctcgc 1140 ccatccaggc attetttgag aaccaggece ggcaacaggg ttacaccete agegeeggee 1200 aggtccgggc aatcgccgcc atggcacgcg aaacccggca ccggctcgcc cgccggccca 1260 ctcgaagcct gtacctgcac ggtccggtgg gacgtggcaa aagctggctg ctggacggtt 1320 tcttccaggc gctgcccatc gccgagaaac agcgtgtgca tttccatgag tttttcgcgc 1380 gettgeaceg eggeatgtte geccaeeggg eegtggeacg atgegetege catgaeeete gatgagttgc tcgacggctg ccaggtgctg tgtttcgacg agttccacgt ccacgacatc 1440 1500 ggcgacgcca tgctgatcac gcggctgttc caggccctgt tccggcgcgg tgtctgggtg 1560 ctggtcacct ccaactatcc gcctgaaggc ctgttgccca accetctgta ccacgagcgt ttcaagccgg tgatcgactt gatcgccgcg cgcatggacg tcttggaagt cagctcccc 1620 gaggattttc gccgcttgcc ccaggcccac gccacgcaac gctttaccac ggggcagtat 1680 1740 gtgtggcccg gcaccgcggc ccaacgcgcg acgctcggcc tccccgccac ggatggcccg 1800 gegeatacce tggcagtggg caaceggcag ttggcetgce getaccatea ggcgcgaacg 1860 gtcgcgttca ccttcagcga cctctgcgaa caactgacgg ccgtgatgga ttacctgctg 1920 ctgtgcgaag atttcgacca ctggatcatc gacggcctgc ctcacctggc cgagtgtccg 1980 attgccgtgc agcagcgctt tatcaacctg gtggacgtgc tctacgacaa agacaagcac 2040 ctggtgctga tcggtgaaca gccactggca caggcgatga gtggcgaggc catcgacctc gcccgcaccg ccagccgcct gaaccaattg caacaggcca gcccgcaacc ggtgcccgac 2100

coggtateat gagogocott tacgccccct agccgagtga cogcgccgct gatgcatacc 2160 2220 ctcgcccaac tcaagtccgg ccaattggcc ggtatccagc gcctggacct gtcctgcggg 2280 ctcaccqaat ttccccqqqa aatcttcqaa ctqqccqact ccctggagat cctcaacctc aqcqqtaacq ccctgagccg gttgcccgac gacctgcatc gcctgccaca cctgcgggta 2340 ctqttctqct cqqacaacqc cttcaccqaa ctqcccqaat gcctgggcca gtgcgcgcaa 2400 2460 ctqaqcatga tcggtttcaa ggccaaccag atcagccacg tgcccgccgc cgcgctgccg 2520 ccgttgctgc gctggctgat cctcaccgac aaccgtatca gccaattgcc cgatgaattg 2580 qqcqaqcqcc cactqctqca aaaactgatg ctggccggca accaattggc gcatctgccg 2640 cegagectga qteactgtea ceacetegaa ttgctgegea tegegteeaa cegetteace cagetgeegg egtggetgtt gaceetgeec ageetgaeet ggetggeeta tgeeggtaae 2700 2760 ccqqtqqaaa tgqcqgtgga tgtagcggtg gacgacgcca cgcccgacat tccttgggcc gagctggaac tggcccaagt gctgggcgaa ggcgcttcgg gggtgattcg caaagcgctg 2820 cgtaaaccca cgggcacgcc cgttgccgtc aagctctaca aaggcaccat caccagcgac 2880 ggttcgccgt tgcacgaaat gcaagcctgc atcgccgccg ggctgcaccc caacctgatc 2940 agggtgcagg gccgcgtcat cggccacccc gatgaccagg ctgcgctggt gatggacctg 3000 3060 ategaccega getacegeaa cetggeggee etgeegagee tggeetegtg taceegtgae 3120 atctacgcgc ccgacacgcg tttcagcgcc aaagtggcct tgcgtatggc acggggcatc gcctcggtgg ccgcgcatct gcaccggcac ggcattaccc atggcgacct ctacggccac 3180 3240 aacateetgt ggaatgaage eggggattge etgetegggg attttggege ggegtegtte catgccacgg cggataccct cgaaacacgg gcgctgcag 3279

```
<210> 11
<211> 67
```

Leu Gln Ala Phe Asp Gln Leu Asn Thr Glu Gln Arg Ala Leu Leu Leu 1 5 10 15

Trp Val Ser Val Glu Gly Leu Ser Tyr Lys Glu Val Ala Glu Ile Leu 20 25 30

<sup>&</sup>lt;212> PRT

<sup>&</sup>lt;213> Pseudomonas fluorescens

<sup>&</sup>lt;400> 11

Asp Val Pro Leu Gly Thr Val Met Ser Arg Leu Ser Arg Ala Arg Gln 35 40 Ala Leu Arg Gln Leu Ser Asp Gly Glu Ile Ala Ser Pro Ser Leu Arg 55 Ile Leu Lys 65 <210> 12 <211> 230 <212> PRT <213> Pseudomonas fluorescens <400> 12 Met Ile Ser Leu Pro Pro Ser Glu Arg Asp Leu His Ala Tyr Val Asp 5 10 15 His Gln Leu Glu Ser Asp Arg Val Leu Glu Thr Trp Leu Thr 25 Ala His Pro Asp Val Ala Ala Gln Val His Ala Trp Gln Gln Asp Ala Gln Leu Leu Arg Ala Ser Leu Ser Gly Ala Leu Gln Gln Pro Ala Asn 55 Pro Asn Leu Asp Pro Ala Leu Phe Ala Thr Ala Ala Val Leu Leu Ile 65 70 Ala Val Ser Leu Gly Gly Leu Gly Gly Trp His Ala Arg Glu Ala Thr 85 90 Gln Ser Pro Gln Gln Pro Met Ala Asp Ala Met Gln Ala Phe Arg Leu 100 105 110

Leu Pro Asp Leu Ser Pro Ser Gly Phe Lys Pro Val Ser Gly Arg Leu 145 150 155 160

Phe Ala Gln Asp Gly Ile Leu Pro Ala Asp Tyr Asn Ala Gln Asp Ser

Gly Thr Met Gln Ala Trp Leu Asp Arg Tyr Phe Asn Gln Ala His Arg

120

115

Leu Ser Thr Glu Gln Gly Ala Ala Ala Met Val Leu Tyr Gln Asp Ala 165 170 175

Gln Gly Arg Arg Ile Ser Phe Tyr Ile Arg Pro Pro Gly Pro Asn Asn 180 185 190

Gly Phe Leu Pro Arg Gly Ser Arg Thr Ala Asp Gly Leu Gln Ala Gln 195 200 205

Tyr Trp Ser Gly Gly Gly Tyr Asn Tyr Ala Val Val Ser Pro Ala Asp 210 215 220

Gln Val Pro Ala His Ala 225 230

<210> 13

<211> 14

<212> PRT

<213> Pseudomonas fluorescens

<400> 13

Met Val Glu Arg Phe Asn Ala Val Val Arg Ala Val Ala Tyr 1 5 10